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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 C.F.R. § 1.53(b))

Attorney Docket No.	PHOENIX
First Inventor or Application Identifier	PANDELISEV
Title	Multiple Selectable Field/Current-Voltage Pads
Express Mail Label No.	

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

1. [X] * Fee Transmittal Form *(e.g., PTO/SB/17)*
(Submit an original and a duplicate for fee processing)

2. [X] Specification [Total Pages 25]
(preferred arrangement set forth below)
- Descriptive title of the Invention
- Cross References to Related Applications
- Statement Regarding Fed sponsored R & D
- Reference to Microfiche Appendix
- Background of the Invention
- Brief Summary of the Invention
- Brief Description of the Drawings *(if filed)*
- Detailed Description
- Claim(s)
- Abstract of the Disclosure

3. [X] Drawing(s) *(35 U.S.C. 113)* [Total Sheets 19]

4. Oath or Declaration [Total Pages 2]
a. [X] Newly executed (original or copy)
b. [ ] Copy from a prior application (37 C.F.R. § 1.63(d))
(for continuation/divisional with Box 16 completed)
i. [ ] DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application, see 37 C.F.R. §§ 1.63(d)(2) and 1.33(b).

NOTE FOR ITEMS 1 & 13: IN ORDER TO BE ENTITLED TO PAY SMALL ENTITY FEES, A SMALL ENTITY STATEMENT IS REQUIRED (37 C.F.R. § 1.27), EXCEPT IF ONE FILED IN A PRIOR APPLICATION IS RELIED UPON (37 C.F.R. § 1.28).

5. [ ] Microfiche Computer Program *(Appendix)*

6. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a. [ ] Computer Readable Copy
b. [ ] Paper Copy (identical to computer copy)
c. [ ] Statement verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

7. [X] Assignment Papers (cover sheet & document(s))
8. [ ] 37 C.F.R.§3.73(b) Statement *(when there is an assignee)* [ ] Power of Attorney
9. [ ] English Translation Document *(if applicable)*
10. [ ] Information Disclosure Statement (IDS)/PTO-1449 [ ] Copies of IDS Citations
11. [ ] Preliminary Amendment
12. [X] Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
13. [X] * Small Entity Statement(s) *(PTO/SB/09-12)* [ ] Statement filed in prior application, Status still proper and desired
14. [ ] Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. [ ] Other: .....
.....
.....

16. If a CONTINUING APPLICATION, *check appropriate box, and supply the requisite information below and in a preliminary amendment:*
[ ] Continuation [ ] Divisional [ ] Continuation-in-part (CIP) of prior application No: _____/_____
Prior application information: Examiner _____ *Group / Art Unit:* _____
For CONTINUATION or DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 4b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

17. CORRESPONDENCE ADDRESS

[ ] *Customer Number or Bar Code Label* *(Insert Customer No. or Attach bar code label here)* or [X] *Correspondence address below*

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STATEMENT CLAIMING SMALL ENTITY STATUS (37 CFR 1.9(f) & 1.27(c))—SMALL BUSINESS CONCERN

Docket Number (Optional): PHOENIX

Applicant, Patentee, or Identifier: Kiril A. Pandelisev
Application or Patent No.:
Filed or Issued: June 5, 2000
Title: Multiple Selectable Field/Current-Voltage Pads Having Individually Powered and Controlled Cells

I hereby state that I am
- ☐ the owner of the small business concern identified below:
- ☒ an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF SMALL BUSINESS CONCERN: Phoenix Scientific Corporation

ADDRESS OF SMALL BUSINESS CONCERN: 4952 East Encanto Street
Mesa, AZ 85205

I hereby state that the above identified small business concern qualifies as a small business concern as defined in 13 CFR Part 121 for purposes of paying reduced fees to the United States Patent and Trademark Office, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time, or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby state that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention described in:

- ☒ the specification filed herewith with title as listed above.
- ☐ the application identified above.
- ☐ the patent identified above.

If the rights held by the above identified small business concern are not exclusive, each individual, concern, or organization having rights in the invention must file separate statements as to their status as small entities, and no rights to the invention are held by any person, other than the inventor, who would not qualify as an independent inventor under 37 CFR 1.9(c) if that person made the invention, or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d), or a nonprofit organization under 37 CFR 1.9(e).

Each person, concern, or organization having any rights in the invention is listed below:
- ☒ no such person, concern, or organization exists.
- ☐ each such person, concern, or organization is listed below.

Separate statements are required from each named person, concern or organization having rights to the invention stating their status as small entities. (37 CFR 1.27)

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

NAME OF PERSON SIGNING: Kiril A. Pandelisev

TITLE OF PERSON IF OTHER THAN OWNER: President

ADDRESS OF PERSON SIGNING: 4952 East Encanto Street, Mesa, AZ 85205

SIGNATURE: K A Pandelisev DATE: June 2, 2000

APPLICATION

FOR

UNITED STATES LETTERS PATENT

FOR

MULTIPLE SELECTABLE FIELD/CURRENT-VOLTAGE PADS HAVING INDIVIDUALLY POWERED AND CONTROLLED CELLS

BY

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Multiple Selectable Field/Current-Voltage Pads Having Individually Powered and Controlled Cells

BACKGROUND OF THE INVENTION

This application claims the benefit of U.S. Provisional Application No. 60/138,300, filed June 9, 1999.

Several modes of therapeutic treatments of wounds are in vogue. Electro-magnetic radiation devices, electrical tissue stimulators, and massage apparatuses are currently in use for stimulating the body's healing processes. Generally, those treatment methods involve placing electrodes on the body and providing an electrical field to stimulate the body part.

Needs exist for portable devices that can be used anywhere at any time to apply energy to wounded tissue and that are capable of being variably controlled within the body of the device. The present invention meets requirement lacking in prior art devices.

SUMMARY OF THE INVENTION

The present invention is a flexible and fully portable unit employing individually powered and controlled cells that produce a radio frequency (RF), electromagnetic radiation (EM), a magnetic field (B) or a current-voltage signal for healing purposes. The cells may have self-contained controls or be remote controlled. The unit may contain only one type of cell or it may be made up of a combination of radiation and signal producing cells. The cells may be of any shape, any size and may be combinations thereof of variable sizes and shapes.

The type of radiation or current-voltage application used,

the strength of the radiation or current-voltage, the pattern of activated cells, the frequency of the signal, the pulse characteristics and its width, the repetition rate, the strength of the signal, the use of a continuous or a pulsating mode, the signal density per unit area, as well as the composition of the cells comprising the pad are determined by the wound being treated, the size and shape of the wound, the depth of the wound, and the type of tissue being treated. The tissue may be soft tissue, a bone fracture, cancerous tissue, a nerve path, or any other body type tissue.

In the case of RF/EM/B applications, certain patterns of the applied field, the pattern of activated cells, the frequency of the signal, the pulse characteristics and the pulse width, the repetition rate, the strength of the signal, the use of a continuous or a pulsating mode, and the signal density per unit area bring very improved healing results over the current techniques.

In the case of current-voltage applications, the choice of applying various signals at selected areas at the periphery of the wound, or across the wound, or any combinations thereof, speeds up the healing process and also provides for applications that are not possible with present techniques.

The combination of a RF/EM/B field and a current-voltage application furthers the non-invasive techniques for healing of various parts of the body.

The unit consists of a pad that fits on a body part, having

multiple small radio frequency transmitters arranged in an array. The transmitter coils directly above a wound are energized to transmit pulsed radio frequency energy to the wound periphery or center or both. Transmitters in the array which are not near the wound are deactivated. As a result, energy is focused on the wound periphery and/or central area to promote rapid healing and tissue growth there. The results are physiological activity at the wound site. Low energy can make a device portable, self-contained and reusable on different wounds after sterilization. One size of the pad fits all. The use of the pad allows for the body's healing energy to be focused precisely where needed, speeding healing and tissue growth.

The unit is portable, allowing the user to obtain the benefits of the unit at any time or location. The unit is extremely flexible in the available methods of providing power to the individual cells. Each cell may be supplied power individually by already incorporated power and signal capabilities. Each cell may be supplied power remotely, by either enabling the desired cells via connections to a control package that is located at one or both ends of the pad, by flexible module surrounding the pad, or by a separate control unit that is powered by standard batteries, rechargeable batteries, or simply by connecting the control unit to a power outlet. Each cell may be turned ON or OFF by a switch on the cell or by a control unit.

The pad is thin, flexible and portable. It may be used by

applying the pad over the patient with the cell surface facing down, under the patient with the cell surface facing up, or in any other desired position. The flexible nature of the pad allows for shaping of the pad and applying it around a leg, arm or any other part of the body that needs treatment. The number of the activated cells as well as the shape of the area that is subjected to the RF/EM/B field or the current-voltage signals, or a combination thereof, and the signal strength, the frequency and other signal characteristics greatly depends on the shape and size of the wounded area to be treated.

Sensors may be incorporated into the pad allow for measuring the dose of the treatment, the temperature of the treated area, blood pressure, or any other relevant parameters.

The cost of maintenance of the pad and the effectiveness of the pad in treating patients is drastically lowered by simply repairing the defective cells.

The invention is a healing cell apparatus comprising a base on which a plurality of cells is arranged orthogonally for application to wounds on a body. The cells apply energy to the wound and peripheral areas of the body, speeding the healing process of soft tissues, bone fractures, cancerous tissues, nerve pathways and other body tissues. The base may be thin, flexible and portable. A power supply individually communicates independently with each of the plurality of cells, and controls connected to the cells control application of power to each of the cells individually. The cells generate radio frequencies,

electro-magnetic radiations, magnetic fields, current-voltage signals, and combinations thereof. The type, strength, pattern, frequency, pulse characteristics, width, repetition rate and signal density of the energy is varied according to the type and size of the wound to be treated and proximity of the cells to the wound. The frequency and field strength of the energy generated by the cells is varied and increases with proximity to a wound. A number of activated cells may be varied. The base may be applied with the cells facing the wound, or encircling a limb. Sensors may be incorporated into the base to measure the dose of the treatment, the temperature of the treated area, blood pressure or other relevant parameters.

The power source may be batteries or a connection to a power outlet, a converter and oscillator, and a transformer. The power source may be mounted on the base, on one end of the base, or on opposite ends of the base. The power source may be connected to the base. Power and signal conduits may be mounted on the base. The power and signal conduits connect to a power and signal generator and control. The power and signal generator and control may be portable.

A control panel, a power supply, and a signal generator and control may each be mounted on either end of the base, or on opposite ends of the base.

Cells may have self-contained controls, which are connected to batteries. Additionally, the cells comprise external connectors on each cell for connecting the cells to external

signal and power controls. The self-contained controls for cells which generate electro-magnetic radiations, radio frequencies, magnetic fields, and combinations thereof comprise power and signal control circuits connected to the batteries, power and signal cables connected to the signal and power control circuits, a field generator coil for generating energy connected to cables, a shielding separating the control circuits form the coil for shielding the control and any adjacent cells from interference, and a coil enclosure and patient insulation interposed between a patient and the coil. The batteries, controls, shielding, coil and cables are surrounded by a housing.

The self-contained controls for cells which generate current-voltage signals comprise power and signal control circuits, power and signal control cables connected to the power and signal control circuits and to the battery, electrodes connected to the power and signal cables, and patient insulation mounting the electrodes.

Cells may be remotely controlled. The cells which are remotely controlled and generate electro-magnetic radiations, radio frequencies, magnetic fields, and combinations thereof. comprise signal and power cables, a field generator coil for generating energy, a coil enclosure, an on/off switch, and shielding for preventing interference with any adjacent cells.

The cells which are remotely controlled and generate current-voltage signals comprise power and signal cables, electrodes, patient insulation, a cable enclosure, and an on/off

switch.

These and further and other objects and features of the invention are apparent in the disclosure, which includes the above and ongoing written specification, with the claims and the drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a diagram of a multiple selectable field generator having forty individually controlled cells.

Figure 2 is a diagram of a multiple selectable field generator having forty individual, remotely powered and controlled cells and a control panel located at only one end of the pad.

Figure 3 is a diagram of a multiple selectable field generator having forty individual, remotely powered and controlled cells and a control panel located at both ends of the pad.

Figure 4 is a diagram of a multiple selectable field generator pad having forty individual, pad powered and controlled cells that is connected to a portable power signal generator and control.

Figure 5 is a diagram of a multiple selectable field generator pad having forty individual, remotely powered and controlled cells.

Figure 6 is a diagram of a multiple selectable field generator pad having forty individual, remotely powered and

controlled cells.

Figure 7 is a plot of position against field strength in relation to the wounded area being treated.

Figure 8 is a plot of position against frequency in relation to the wounded area being treated.

Figure 9 is a plot of position against field strength and frequency in relation to the wounded area being treated.

Figure 10 is a block diagram of a self-contained EM/RF/magnet field unit cell.

Figure 11 is a block diagram of a self-contained current-voltage unit cell.

Figure 12 is a block diagram of a remote controlled EM/RF/magnet field unit cell.

Figure 13 is a block diagram of a remote controlled current-voltage unit cell.

Figure 14 is a diagram of a remote controlled/self-contained flexible, cylindrically shaped multiple unit cell for bone regrowth and other applications having any type activated region that has multiple RF/EM/B field/current-voltage control sensors.

Figure 15 is a diagram of a remote controlled/self-contained flexible, cylindrically shaped unit cell for bone regrowth and other applications.

Figure 16 is a diagram of a remote controlled, self-contained flexible, cylindrically shaped multiple unit cell for bone regrowth and other applications that has a cross type activated region.

Figure 17 is a remote controlled/self-contained flexible, cylindrically shaped multiple unit cell for bone regrowth and other applications having an elongated type activated region.

Figure 18 is a remote controlled/self-contained flexible, cylindrically shaped multiple unit cell for bone regrowth and other applications that has a radial/helical type activated region.

Figure 19 is a remote controlled/self-contained flexible, cylindrically shaped multiple unit cell for bone regrowth and other applications having any type activated region having multiple RF/EM/B field/current-voltage control sensors.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

The present invention is a flexible and fully portable unit 1 employing individually powered and controlled cells 3 that produce a radio frequency (RF), electromagnetic radiation (EM), a magnetic field (B) or a current-voltage signal for healing purposes, as shown in Figures 1 - 6. The cells 3 are contained in the unit 1 by a pad housing 5. The cells 3 may have self-contained controls, as shown in Figure 1, or be remotely controlled, as shown in Figures 2, 3 and 5. The unit 1 may contain only one type of cell 3 or it may be made up of a combination of radiation and signal producing cells.

The type of radiation or current-voltage application used, the strength of the radiation or current-voltage, the pattern of activated cells, the frequency of the signal, the pulse

characteristics and its width, the repetition rate, the strength of the signal, the use of a continuous or a pulsating mode, the signal density per unit area, as well as the composition of the cells 3 comprising the pad 1 are determined by the wound being treated, the size and shape of the wound, the depth of the wound, and the type of tissue being treated. The tissue may be soft tissue, a bone fracture, cancerous tissue, a nerve path, or any other body type tissue.

In the case of RF/EM/B applications, certain patterns of the applied field, the pattern of activated cells, the frequency of the signal, the pulse characteristics and the pulse width, the repetition rate, the strength of the signal, the use of a continuous or a pulsating mode, and the signal density per unit area bring very improved healing results over the current techniques.

In the case of current-voltage applications, the choice of applying various signals at selected areas at the periphery of the wound, or across the wound, or any combinations thereof, speeds up the healing process and also provides for applications that are not possible with present techniques.

The combination of a RF/EM/B field and a current-voltage application furthers the non-invasive techniques for healing of various parts of the body.

The unit 1 is portable, allowing a user to obtain the benefits of the unit at any time or location. The unit 1 is also extremely flexible in the available methods of providing power to

the individual cells. Each cell 3 may be supplied power individually by already incorporated power and signal capabilities, as shown in Figure 1. Each cell 3 may be supplied power remotely, by either enabling the desired cells via connections to a control package 7 that is located at one or both ends of the pad or on a side away from the side facing the user (Figures 2 and 3, respectively), by a flexible module surrounding the pad 9 (Figure 4), or by a separate control unit (Figure 5) that is connected to the unit by a connector 11 that is powered by standard batteries, rechargeable batteries 10 (Figure 4), or simply by connecting the control unit to a power outlet. The batteries may be provided between the pad and the power outlet having connections, such as cable or the like, between the batteries, power outlet and the pad. Each cell 3 may be turned ON or OFF by a switch on the cell or by a separate control unit.

The pad 1 is thin, flexible and portable. It may be used by applying the pad over the patient with the cell surface facing down, under the patient with the cell surface facing up, or in any other desired position. The pad may be positioned proximal the body and may be spaced from the body or in contact with the body or be selectively in contact with or spaced from the body depending on the position of individual cells on the pad. For example, the cells may have variable positions on the pad with some of the cells being in contact with the body and some spaced form the body when the pad is in use.

Figure 6 shows an example of how the pad 1 is placed over a

wound 13 that is to be treated. Figures 7, 8 and 9 show the varying intensity of the individual cells in relation to the cell's proximity to the wound 13 that is to be treated.

Figures 10 and 11 show an individual cell 3 that contains controls within the cell itself. Figure 10 shows a cell 3 that uses electromagnetic radiation, radio frequencies or a magnetic field to treat the wound. A battery 15 and signal and power control circuits 17 are both contained within the individual cell 3. Signals received by the signal and power controls 19 activate the battery 15 and the signal and power control circuits 17 that cause the field generator coil 18 to create a field. Signal and power cables 25 connect the signal and power controls 19, the battery 15, the signal and power control circuits 17, and the field generator coil 18 together. Shielding 21 around the cell 3 limits exposure to the generated field to only the wound that is to be treated. Insulation 23 houses the coil 18 and prevents direct contact with the coil by the patient.

Figure 11 shows a cell 3 that uses current-voltage signals to treat the wound. A battery 15 and signal and power control circuits 17 are both contained within the individual cell 3, for internal control. However, the circuits may be outside the cell for generating and controlling current-voltage signals externally from a signal and control instrument or from a combined signal and control module. Some cells may have internal and some external generation and control as desired. The current-voltage cells may have one or more contacts with the body.

Signals received by the signal and power controls 19 activate the battery 15 and the signal and power control circuits 17 that cause the electrodes 27 to create an electrical signal. The electrodes 27 may be placed directly on the patient. Signal and power cables 25 connect the signal and power controls 17, the battery 15, the signal and power circuits 17, and the electrodes 27 together.

Figures 12 and 13 show an individual cell 3 that is remote controlled. Figure 12 shows a cell 3 that uses electromagnetic radiation, radio frequencies or a magnetic field to treat the wound. Signal and power cables 25 connect the power supply to the individual cells 3. An on/off switch 31 located at each cell 3 supplies power to the field generator coil 18 for creating a field to treat the wound. The on/off switch 31 is used to select which individual cells 3 of the pad are to be used for treating the wound. Shielding 21 around the cell 3 limits exposure to the generated field to only the wound that is to be treated. Insulation 23 houses the coil 18 and prevents direct contact with the coil by the patient.

Figure 13 shows a cell 3 that uses current-voltage signals to treat the wound. Signal and power cables 25 connect the power supply to the individual cells 3. An on/off switch 31 located at each cell 3 supplies power to the electrodes 27 for creating electrical signals to treat the wound. The on/off switch 31 is used to select which individual cells 3 of the pad are to be used for treating the wound. The electrodes 27 are placed directly on

the patient.

The flexible nature of the pad 1 allows for shaping of the pad and applying it around a leg, arm or any other part of the body 42 that needs treatment, as shown in Figure 14. The number of the activated cells as well as the shape of the area that is subjected to the RF/EM/B field or the current-voltage signals, or a combination thereof, and the signal strength, the frequency and other signal characteristics greatly depends on the shape and size of the wounded area to be treated. As shown in Figure 15, the pad 1 may comprise one unitary cell 3, or the pad 1 may have multiple cells 3, as shown in Figure 16. As shown in Figures 16, 17 and 18, the activated area may be cross 33, vertically 37 or horizontally 39 shaped. The cells may have varied shapes such as, but not limited to, quadrilateral, triangular, polygonal, orthogonal, circular or any other shape and combinations thereof. The size of individual cells are varied and are not limited to a particular size with combinations of sizes possible and within the scope of this invention.

Sensors 41 may be incorporated into the pad 1. The sensors may be used for measuring the dose of the treatment, the temperature of the treated area, blood pressure, or any other relevant parameters, as shown in Figure 19.

The cost of maintenance of the pad and the effectiveness of the pad in treating patients is drastically lowered by simply repairing the defective pads.

While the invention has been described with reference to

specific embodiments, modifications and variations of the invention may be constructed without departing from the scope of the invention, which is defined in the following claims.

I claim:

1. A healing cell apparatus comprising a base for placing on a body, a plurality of cells arranged on the base, a power supply individually communicating independently with each of the cells and controls connected to the cells separately controlling application of power to each of the cells individually.

2. The apparatus of claim 1, wherein the base is thin, flexible and portable.

3. The apparatus of claim 1, wherein the cells generate energy selected from the group of energies consisting of radio frequencies, electro-magnetic radiations, magnetic fields, current-voltage signals, and combinations thereof.

4. The apparatus of claim 1, wherein the power supply is a power source selected from the group consisting of batteries, power outlet, converter and oscillator, transformer, and combinations thereof.

5. The apparatus of claim 4, wherein the power source is mounted on the base.

6. The apparatus of claim 4, wherein the power source is connected to the base.

7. The apparatus of claim 1, further comprising self-contained controls in each cell.

8. The apparatus of claim 1, further comprising batteries connected to the self-contained controls.

9. The apparatus of claim 8, wherein the self-contained controls comprise control circuits connected to the batteries,

cables connected to the control circuits, a field generator coil for generating energy connected to cables, a shielding separating the control circuits from the coil for shielding the control and any adjacent cells from interference, and a coil enclosure and patient insulation interposed between a patient and the coil.

10. The apparatus of claim 9, wherein the control circuits are power control circuits.

11. The apparatus of claim 9, wherein the control circuits are signal control circuits.

12. The apparatus of claim 9, wherein the cables are signal cables.

13. The apparatus of claim 9, wherein the cables are power cables.

14. The apparatus of claim 9, wherein the energy is selected from a group of energies consisting of electro-magnetic radiations, radio frequencies, magnetic fields, and combinations thereof.

15. The apparatus of claim 9, wherein the battery, the control, the shielding, the coil and the cables are surrounded by a housing.

16. The apparatus of claim 1, further comprising remote controls for controlling the cells remotely.

17. The apparatus of claim 16, wherein each cell further comprises cables, a field generator coil for generating energy, patient insulation interposed between a patient and the coil, a coil enclosure, and shielding for preventing interference.

18. The apparatus of claim 17, further comprising an on/off switch connected to the cables.

19. The apparatus of claim 17, wherein the cables are power cables.

20. The apparatus of claim 17, wherein the cables are signal cables.

21. The apparatus of claim 17, wherein the energy is selected from a group of energies consisting of electro-magnetic radiations, radio frequencies, magnetic fields, and combinations thereof.

22. The apparatus of claim 16, wherein each cell further comprises cables connected to electrodes for producing current-voltage signals, patient insulation and a cable enclosure.

23. The apparatus of claim 22, wherein the cables are power cables.

24. The apparatus of claim 22, wherein the cables are signal cables.

25. The apparatus of claim 22, further comprising an on/off switch connected to the cables.

26. The apparatus of claim 1, wherein the cells have an orthogonal arrangement on the base.

27. The apparatus of claim 1, further comprising control conduits mounted on the base.

28. The apparatus of claim 27, wherein the control conduits are connected to a power and signal generator and control.

29. The apparatus of claim 27, wherein the power and signal

generator and control are portable.

30. The apparatus of claim 27, wherein the control conduits are power control conduits.

31. The apparatus of claim 27, wherein the control conduits are signal control conduits.

32. The apparatus of claim 1, further comprising a control panel mounted on one end of the base.

33. The apparatus of claim 1, further comprising control panels mounted on opposite ends of the base.

34. The apparatus of claim 1, further comprising a battery power supply mounted on one end of the base.

35. The apparatus of claim 1, further comprising battery power supplies mounted on opposite ends of the base.

36. The apparatus of claim 1, further comprising a signal generator and control mounted on one end of the base.

37. The apparatus of claim 1, wherein a signal generator and control is mounted transverse from another signal generator and control on an opposite end of the base.

38. The apparatus of claim 2 wherein the frequency and field strength of the energies are variable with increasing frequencies for indicating proximity to the wounds to be treated.

39. The apparatus of claim 1, wherein the base encircles a limb on the body.

40. The apparatus of claim 1, further comprising sensors incorporated into the base.

41. The apparatus of claim 40, wherein the sensors measure

different parameters indicative of the wounds to be treated.

42. A healing cell apparatus comprising cells having self-contained controls, wherein the self-contained controls comprise control circuits connected to the batteries, cables connected to the control circuits, a field generator coil for producing energy connected to the cables, a shielding separating the control circuits from the coil for shielding the control and any adjacent cells from interference, and a coil enclosure and patient insulation interposed between a patient and the coil.

43. The apparatus of claim 42, wherein the control circuits are power control circuits.

44. The apparatus of claim 42, wherein the control circuits are signal control circuits.

45. The apparatus of claim 42, wherein the cables are power cables.

46. The apparatus of claim 42, wherein the cables are signal cables.

47. The apparatus of claim 42, wherein the energy is selected from a group consisting of electro-magnetic radiations, radio frequencies, magnetic fields, and combinations thereof.

48. The apparatus of claim 42, further comprising a housing for surrounding the battery, the control, the shielding, the coil and the cables.

49. The apparatus of claim 19, further comprising external connectors on each cell for connecting the cells to external signal and power controls.

50. A healing cell apparatus for producing current-voltage signals comprising cells mounted on a base, wherein each cell comprises a battery and a self-contained control connected to the battery.

51. The apparatus of claim 50, wherein the self-contained control comprises control circuits, cables connected to the control circuits and to the battery, electrodes connected to the cables, and patient insulation for mounting the electrodes.

52. The apparatus of claim 51, wherein the control circuits are power control circuits.

53. The apparatus of claim 51, wherein the control circuits are signal control circuits.

54. The apparatus of claim 51, wherein the cables are power cables.

55. The apparatus of claim 51, wherein the cables are signal cables.

56. The apparatus of claim 51, further comprising a housing for the battery, the control circuits, and the cables.

57. The apparatus of claim 19, further comprising external connectors on each cell for connecting the cells to external signal and power controls.

58. A method for healing wounds comprising mounting a plurality of cells on a base, placing the base proximate a wound on a body, applying energy from the cells to the wound and peripheral areas of the body by communicating power from a power source to the cells and controlling application of power to the

cells individually for speeding the healing of soft tissues, bone fractures, cancerous tissues, nerve pathways and other body tissues being treated.

59. The method of claim 58, wherein applying the energy comprises selecting from a group consisting of radio frequencies, electro-magnetic radiations, magnetic fields, current-voltage signals, and combinations thereof.

60. The method of claim 58, wherein mounting the cells comprises mounting the cells on a thin, flexible and portable base.

61. The method of claim 58, wherein type, strength, pattern, frequency, pulse characteristics, width, repetition rate, and signal density of the energy is varied according to the type and size of the wound to be treated and proximity of the cells to the wound.

62. The method of claim 58, further comprising variably activating and controlling activation of each cell.

63. The method of claim 58, wherein placing the base on the wound comprises placing the cells facing a wound or encircling a limb.

64. The apparatus of claim 1, wherein the cells have varied shapes.

65. The apparatus of claim 1, wherein the cells have varied sizes.

66. The apparatus of claim 1, further comprising a battery power supply on the base, a power outlet connected to the base

and connections between the battery power supply, the power outlet and the base.

67. The apparatus of claim 1, further comprising a battery power supply mounted on the base.

68. The apparatus of claim 67, wherein the battery power supply is mounted on a right side of the base.

69. The apparatus of claim 67, wherein the battery power supply is mounted on a left side of the base.

70. The apparatus of claim 67, wherein the battery power supply is mounted on a top side of the base.

71. The apparatus of claim 67, wherein the battery power supply is mounted on a bottom side of the base.

72. The apparatus of claim 67, wherein the battery power supply is mounted on a side of the base away from the body.

73. The apparatus of claim 42, wherein the cells have varied shape.

74. The apparatus of claim 42, wherein the cells have variable sizes.

75. The apparatus of claim 50, wherein the cells have varied shape.

76. The apparatus of claim 50, wherein the cells have variable sizes.

77. The method of claim 58, wherein placing the base on a body comprises placing the base proximate body.

78. The method of claim 77, wherein placing the base proximate the body comprises placing the base in contact with the

body.

79. The method of claim 77, wherein placing the base proximate the body comprises placing the base spaced from the body.

80. The method of claim 77, wherein placing the base proximate the body comprises placing predetermined cells in contact with the body while placing other cells spaced from the body.

81. The apparatus of claim 50, wherein the control circuits are power and signal control circuits positioned within each cell for internally generating and controlling signals.

82. The apparatus of claim 50, wherein the control circuits are power and signal control circuits positioned outside the cells and a signal and control instrument connected to the circuits for externally generating and controlling signals.

83. The apparatus of claim 50, wherein the control circuits are power and control circuits selectively positioned inside or outside the cells, a combined signal and control module connected to the circuits for selectively controlling the cells.

ABSTRACT OF THE DISCLOSURE

A method and apparatus for speeding the healing process of soft tissues, bone fractures, cancerous tissue, nerve pathways and other body tissues wherein a portable base comprising a plurality of cells is applied with the cells facing or encircling the wound. The cells generate electro-magnetic radiations, radio frequencies, magnetic fields, current-voltage signals or combinations thereof via a field generator coil or electrodes. Each cell is powered and controlled individually via self-contained controls or remote controls. The type, frequency, pulse characteristics, repetition rate and signal density of the energy are varied according to the size and type of wound to be treated and according to the proximity of each cell to the wounded tissue.

Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8) indvidually powered and controlled cells

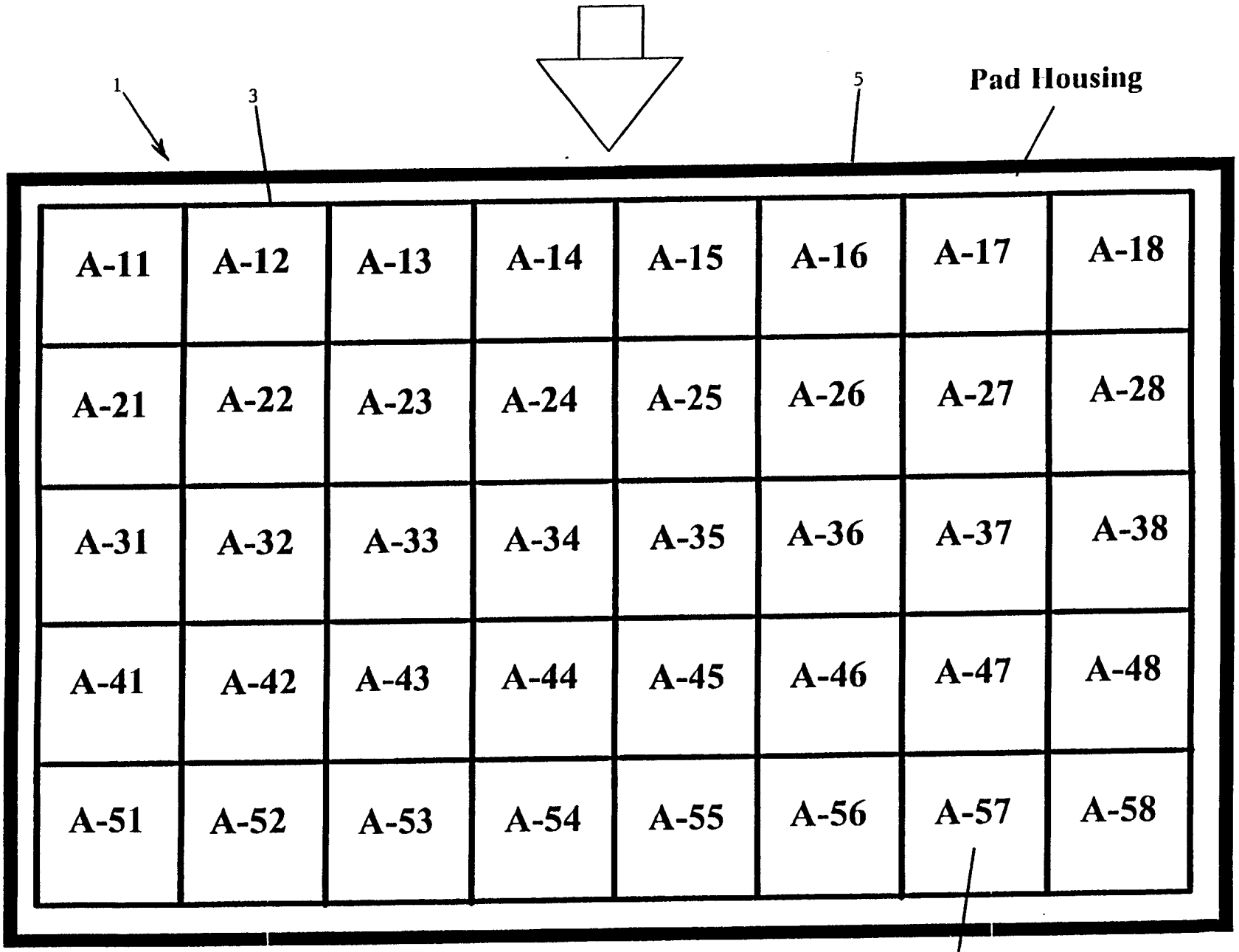
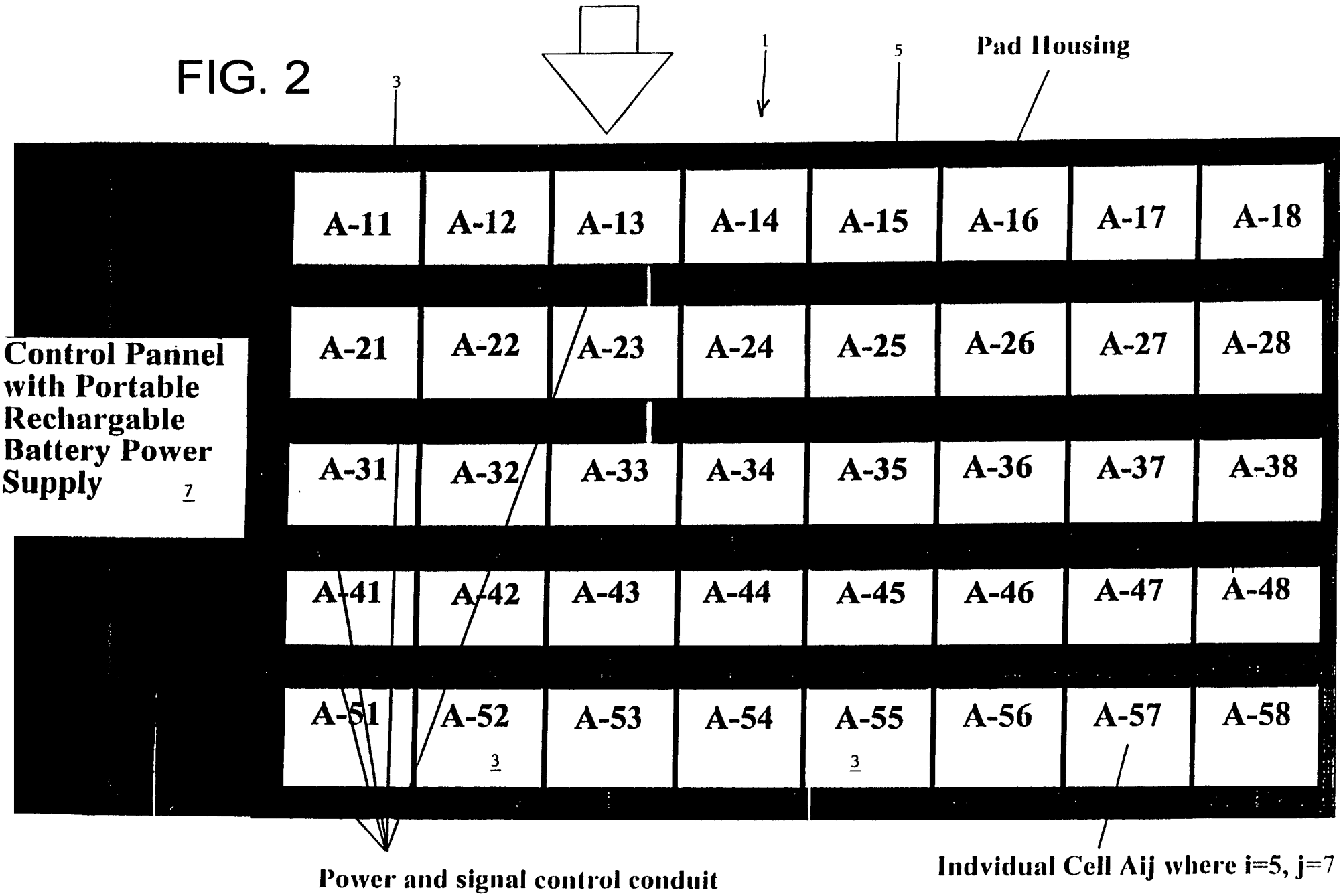


FIG. 1

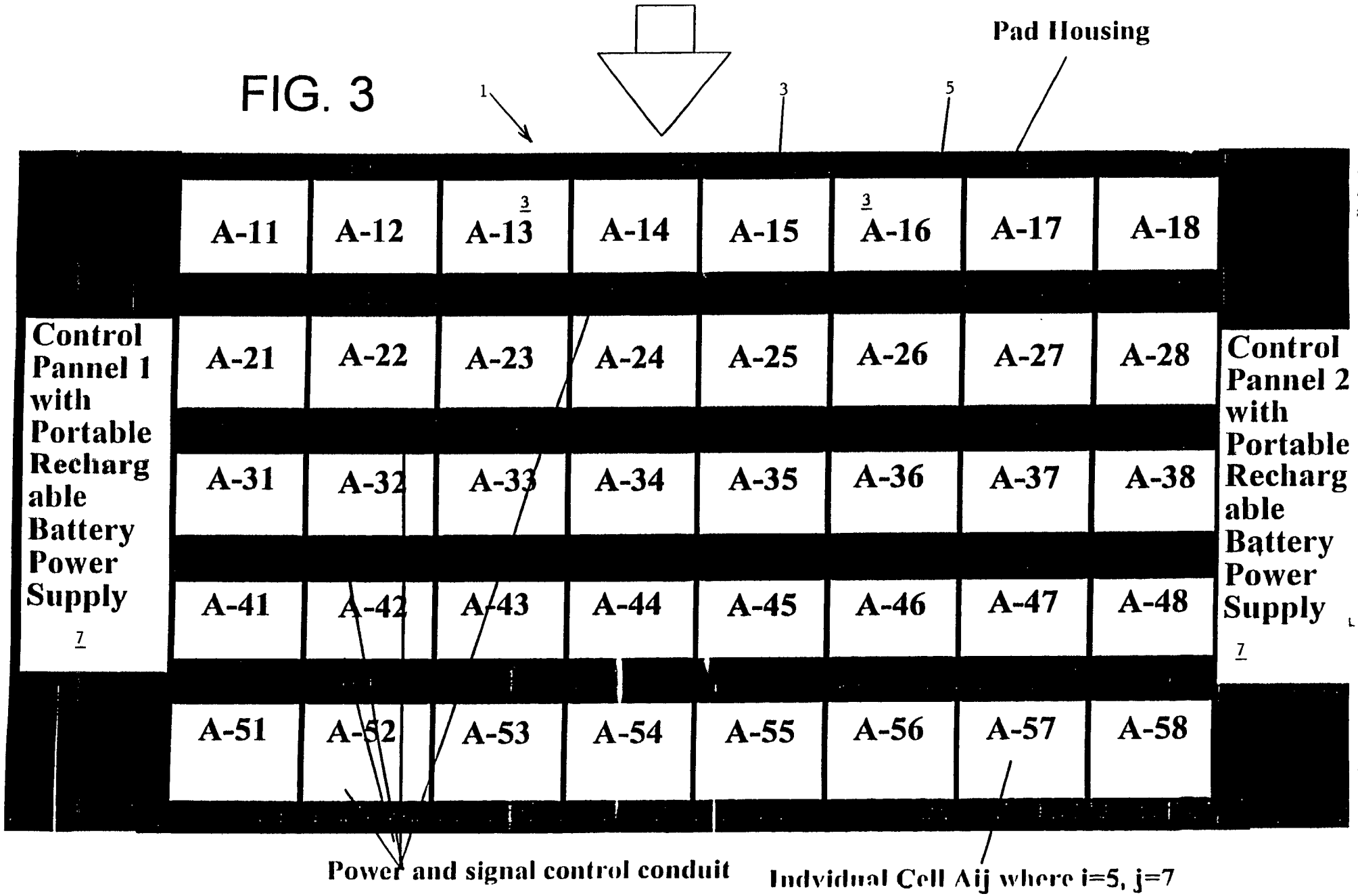
Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8) individual,remotely powered and controlled cells

FIG. 2



Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8) individual,remotely powered and controlled cells

FIG. 3



Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8) individual, pad powered and controlled cells

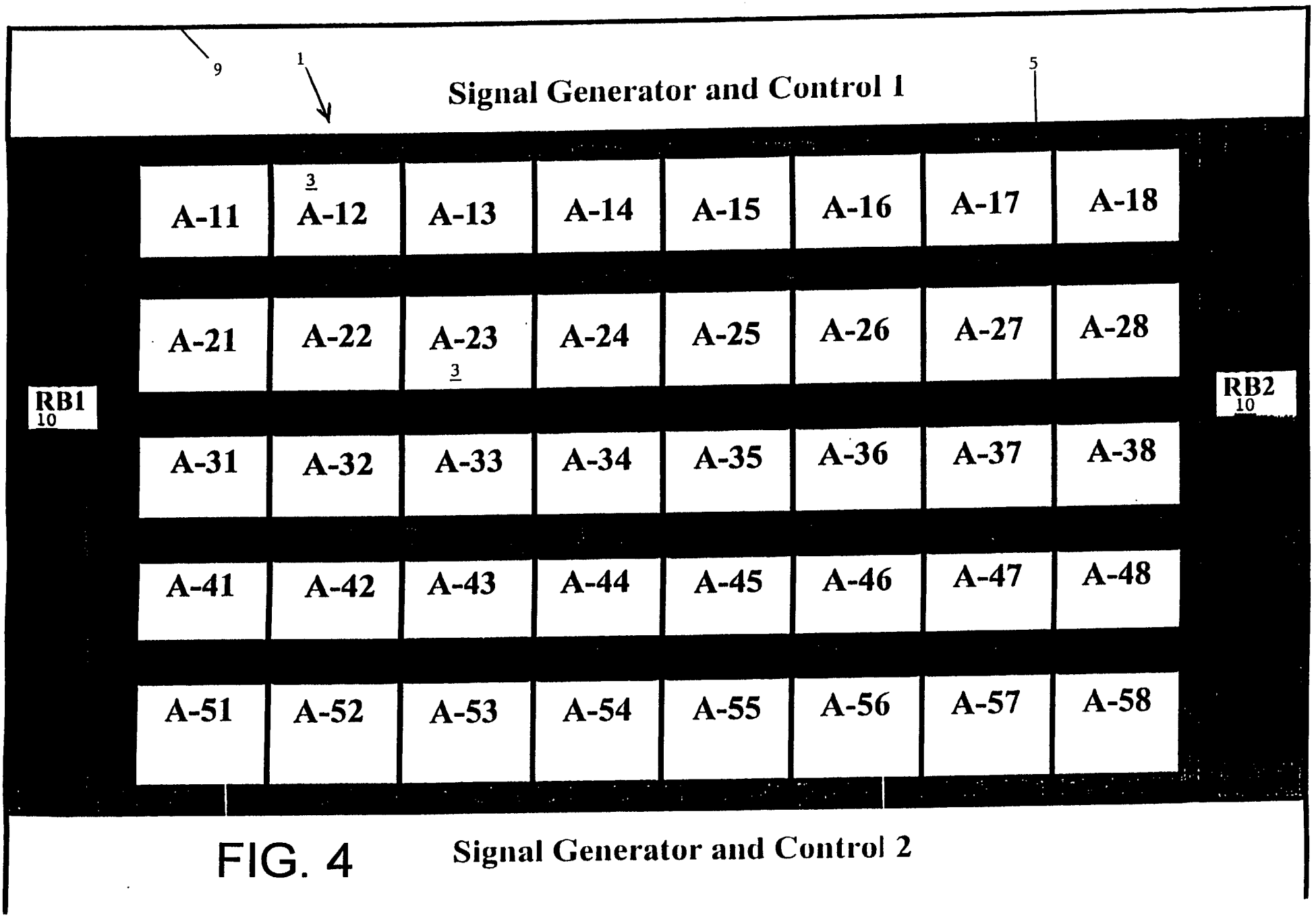


FIG. 4

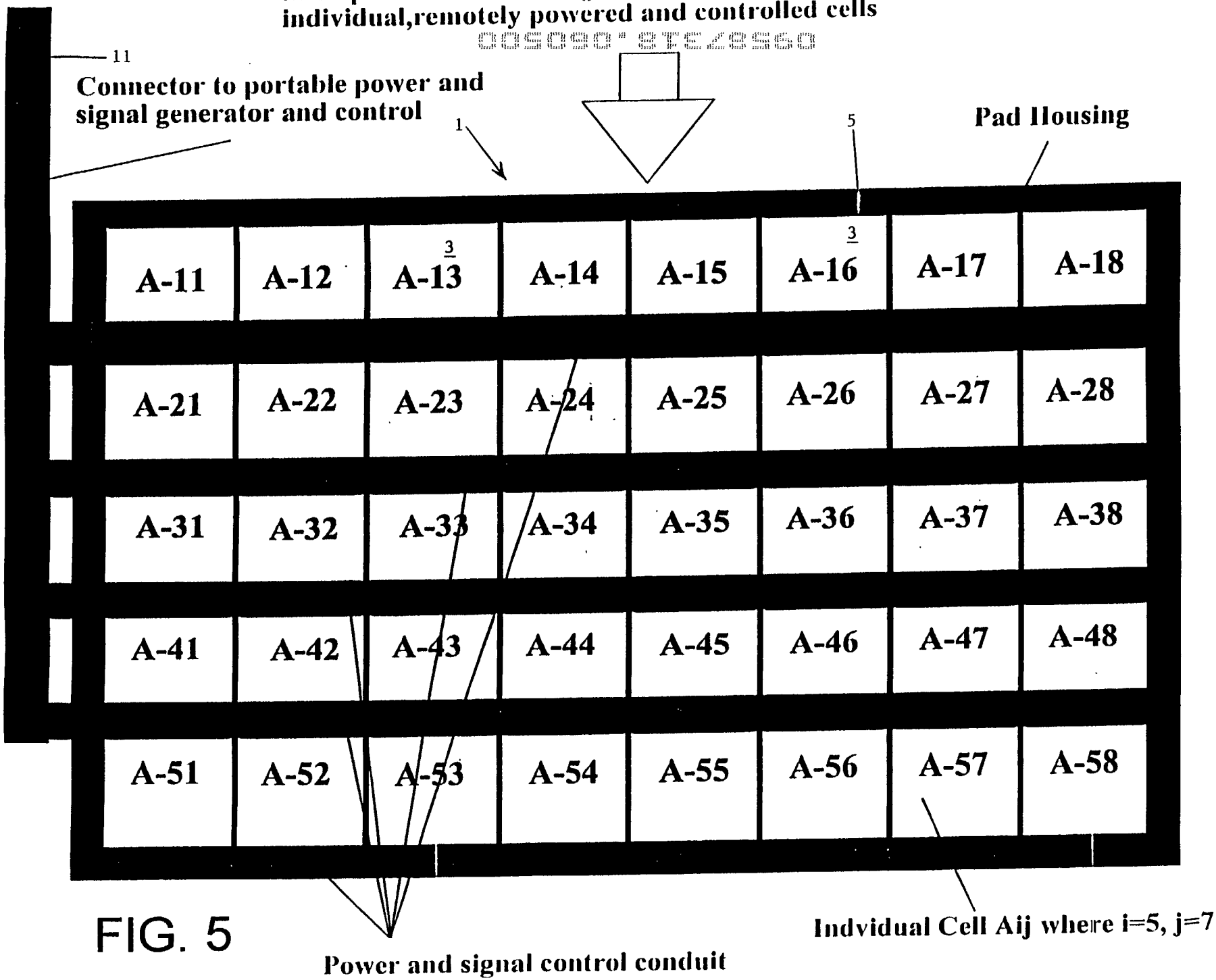

Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8)
individual,remotely powered and controlled cells
11
Connector to portable power and signal generator and control
1
5
Pad Housing
3
3
A-11
A-12
A-13
A-14
A-15
A-16
A-17
A-18
A-21
A-22
A-23
A-24
A-25
A-26
A-27
A-28
A-31
A-32
A-33
A-34
A-35
A-36
A-37
A-38
A-41
A-42
A-43
A-44
A-45
A-46
A-47
A-48
A-51
A-52
A-53
A-54
A-55
A-56
A-57
A-58
Power and signal control conduit
Indvidual Cell Aij where i=5, j=7

FIG. 5

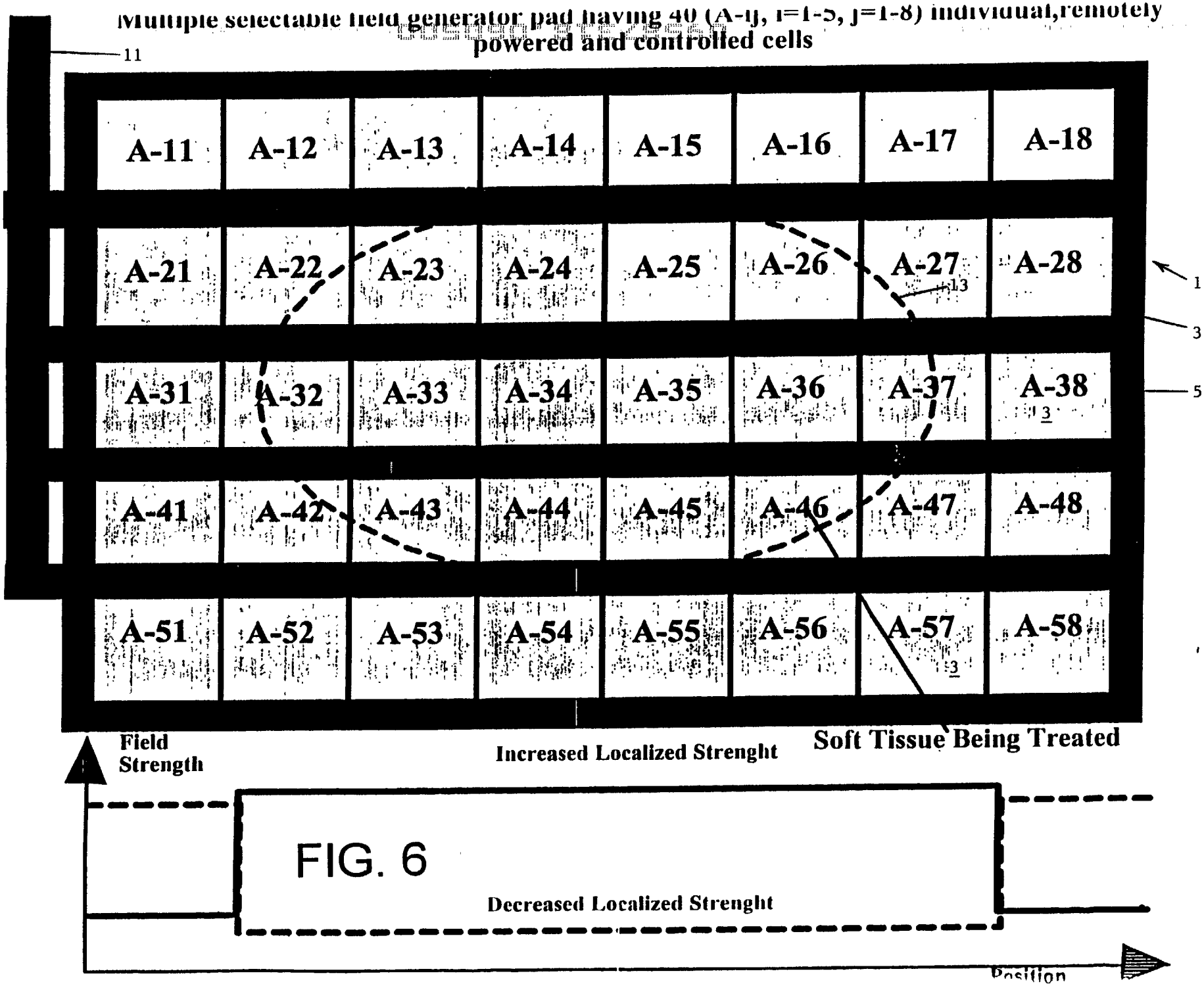

Multiple selectable field generator pad having 40 (A-ij, i=1-5, j=1-8) individual,remotely powered and controlled cells
11
A-11
A-12
A-13
A-14
A-15
A-16
A-17
A-18
A-21
A-22
A-23
A-24
A-25
A-26
A-27
A-28
A-31
A-32
A-33
A-34
A-35
A-36
A-37
A-38
A-41
A-42
A-43
A-44
A-45
A-46
A-47
A-48
A-51
A-52
A-53
A-54
A-55
A-56
A-57
A-58
13
1
3
5
Field Strength
Increased Localized Strenght
Soft Tissue Being Treated
Decreased Localized Strenght
Position

FIG. 6

FIG. 7

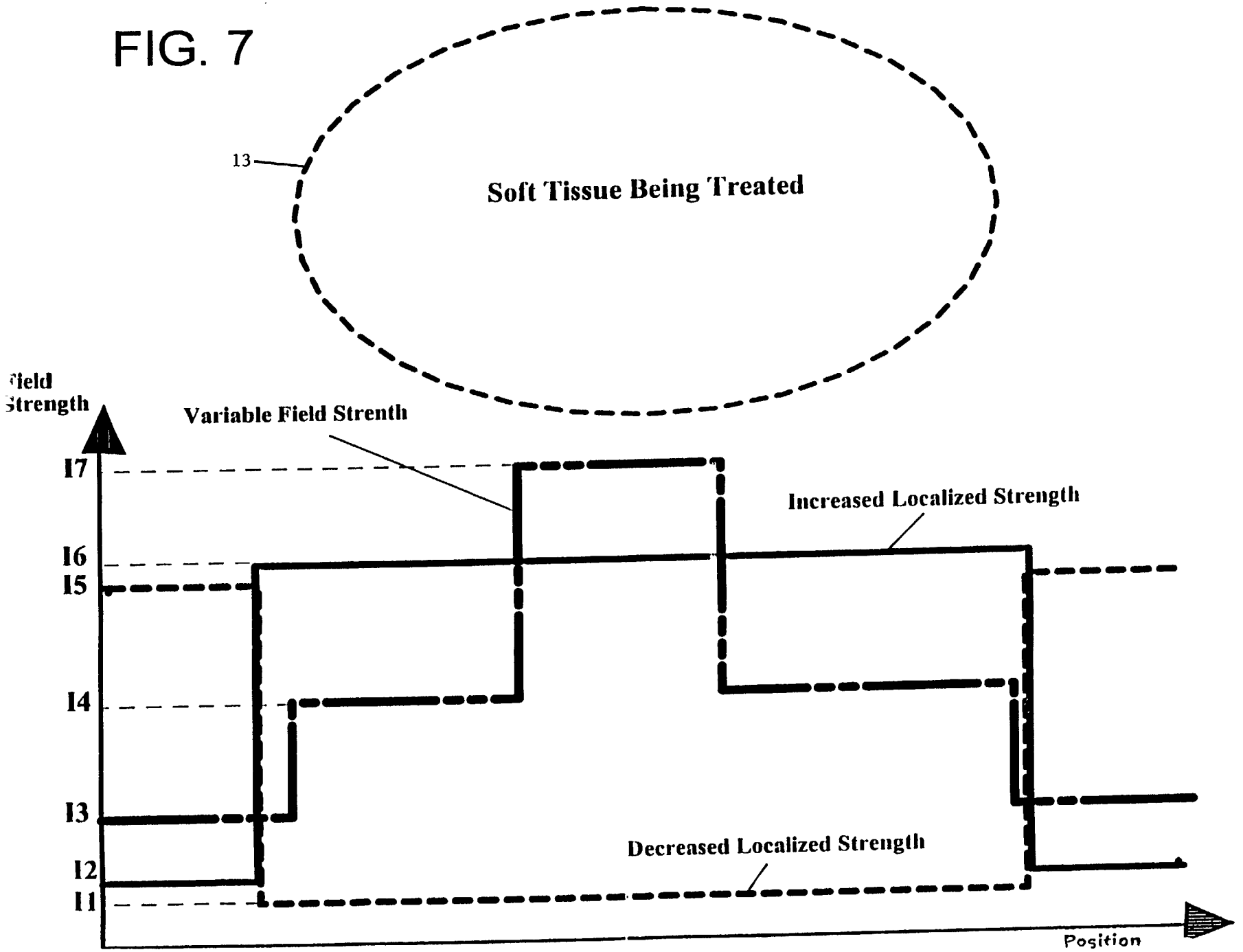

13
Soft Tissue Being Treated
Field Strength
Variable Field Strenth
Increased Localized Strength
Decreased Localized Strength
I7
I6
I5
I4
I3
I2
I1
Position

FIG. 8

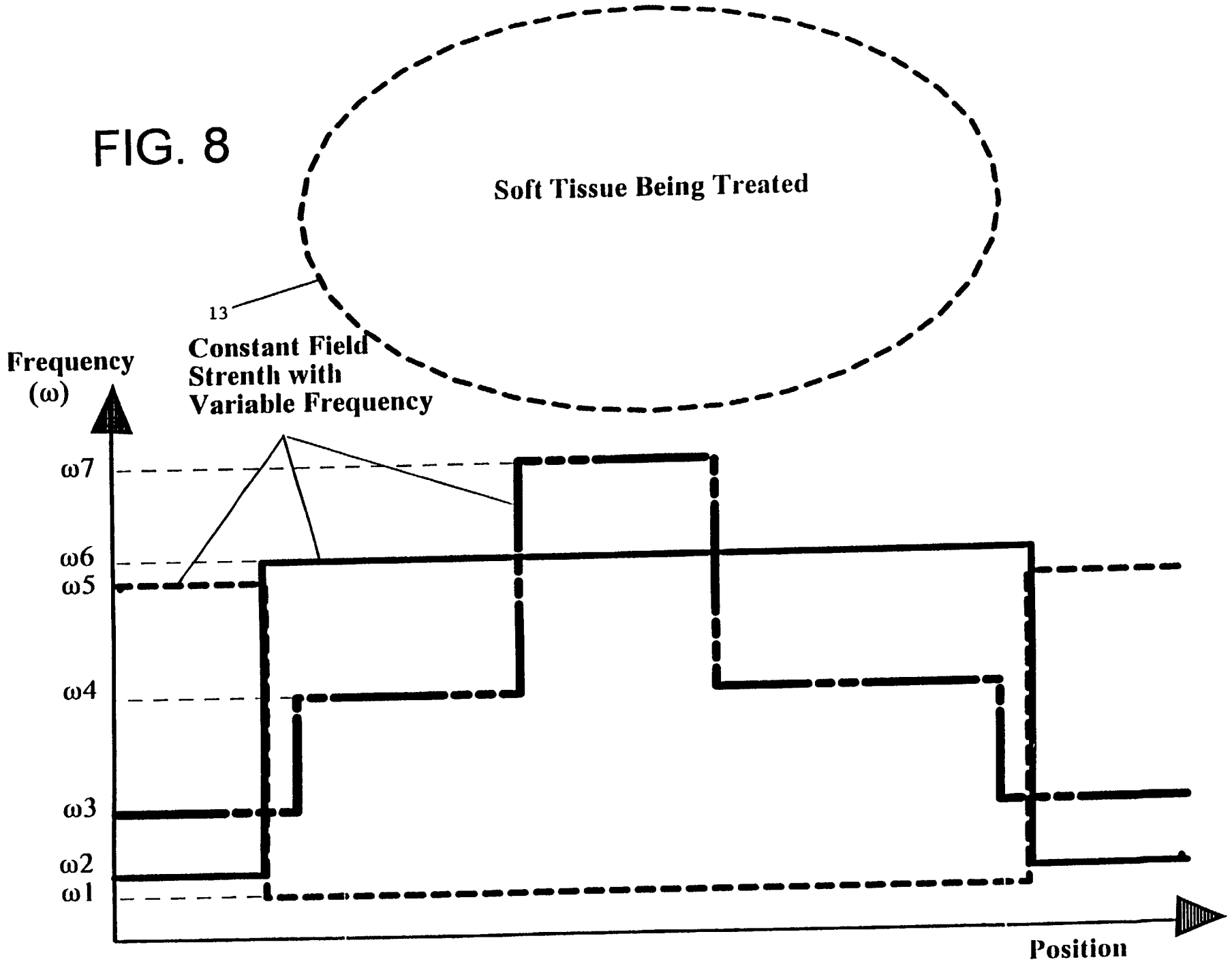
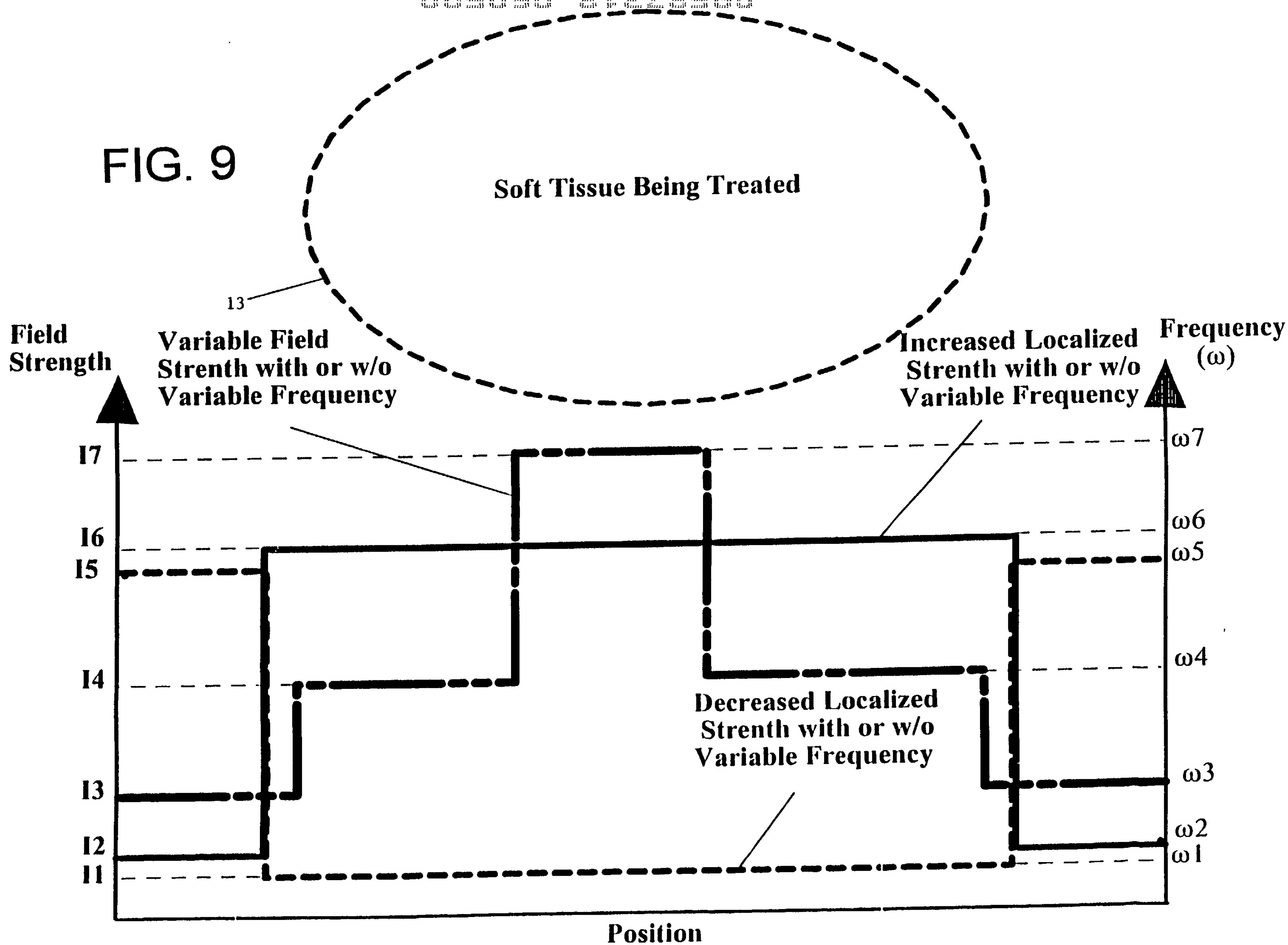

Soft Tissue Being Treated
13
Constant Field Strenth with Variable Frequency
Frequency (ω)
ω7
ω6
ω5
ω4
ω3
ω2
ω1
Position

FIG. 9


Soft Tissue Being Treated
13
Field Strength
Variable Field Strenth with or w/o Variable Frequency
Increased Localized Strenth with or w/o Variable Frequency
Frequency (ω)
I7
I6
I5
I4
I3
I2
I1
ω7
ω6
ω5
ω4
ω3
ω2
ω1
Decreased Localized Strenth with or w/o Variable Frequency
Position

Self Contained EM/RF/Magnet Field Unit Cell

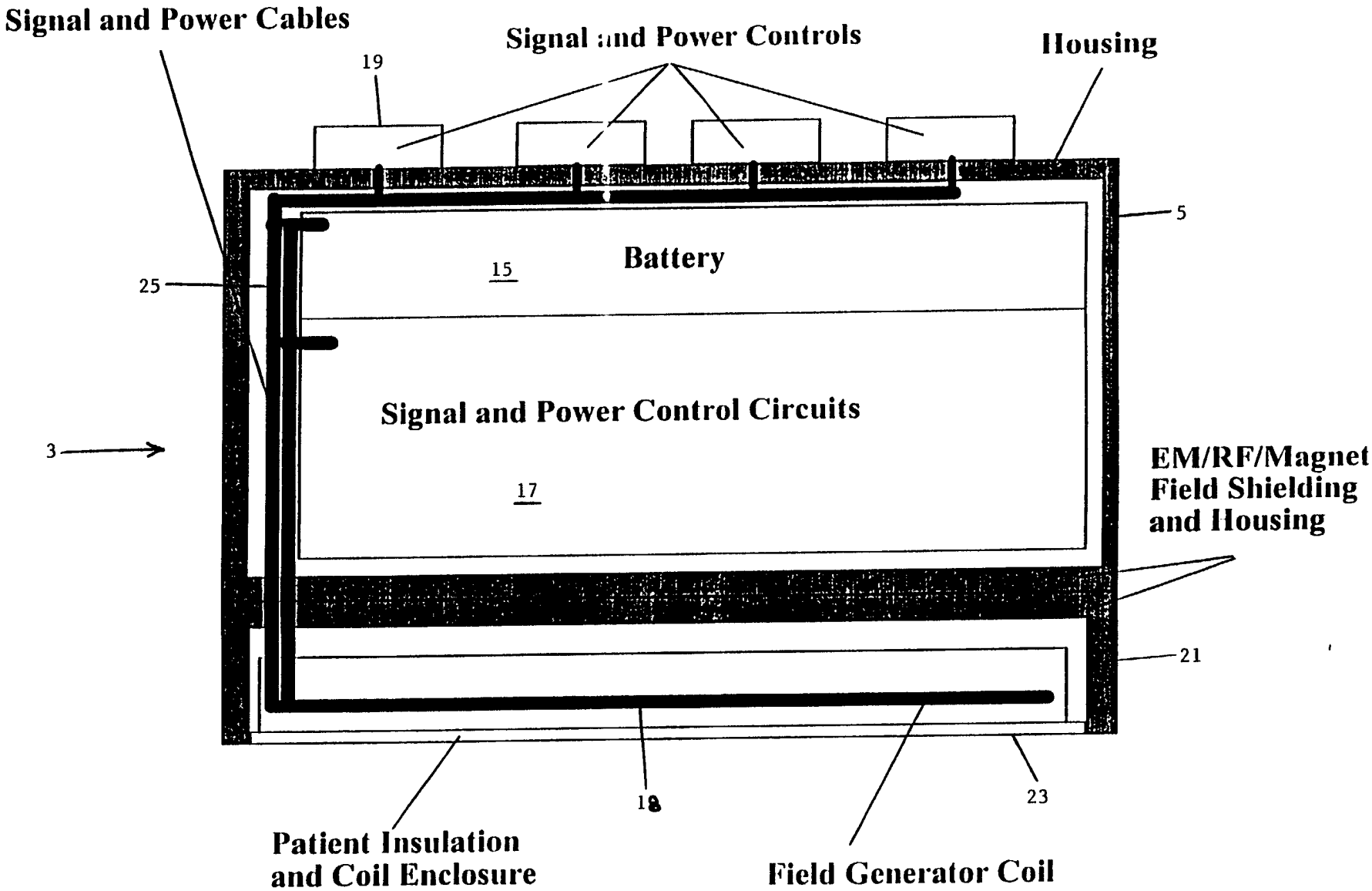


FIG. 10

Self Contained Current-Voltage Unit Cell

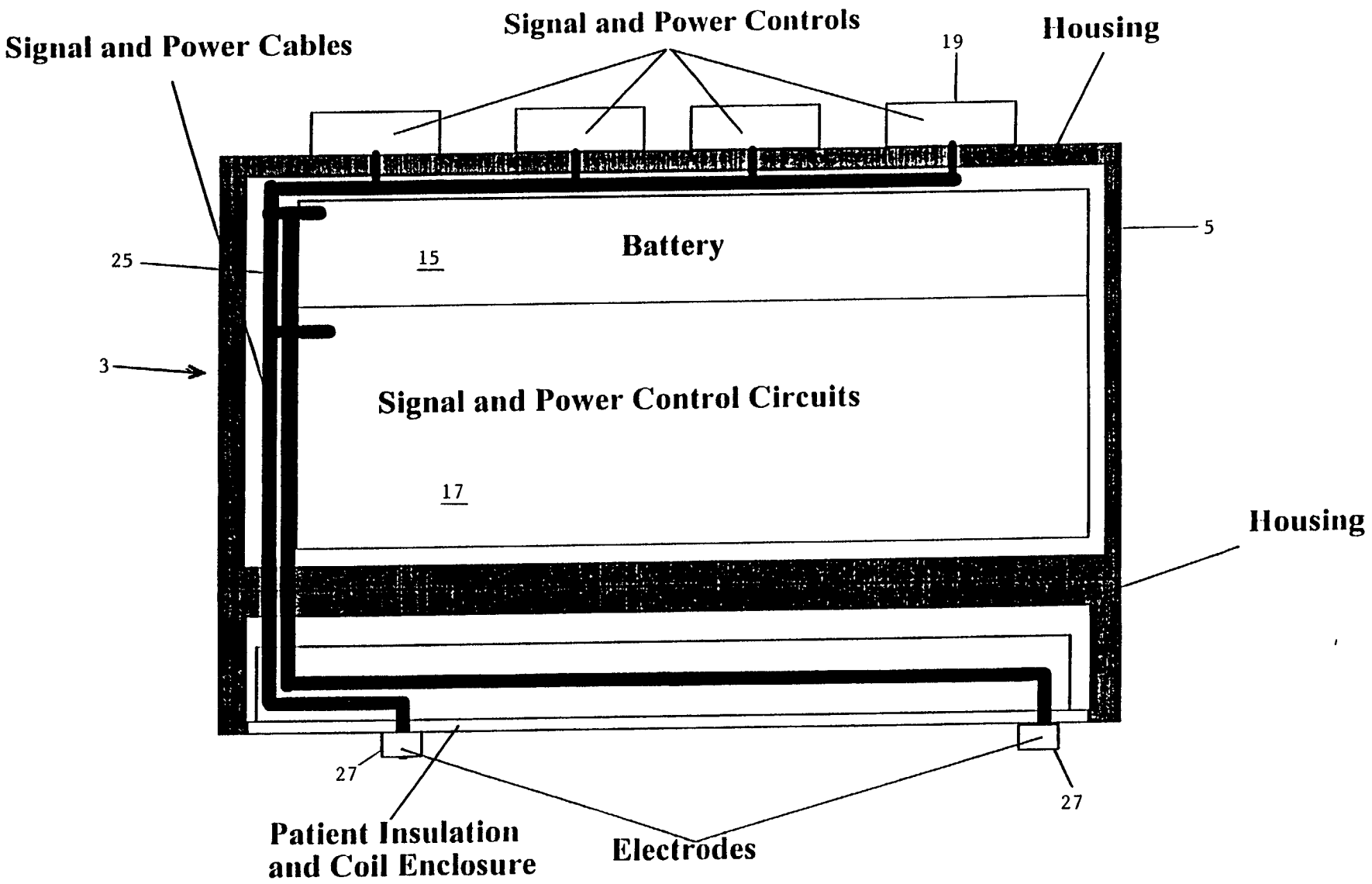


FIG. 11

Remote Controlled EM/RF/Magnet Field Unit Cell

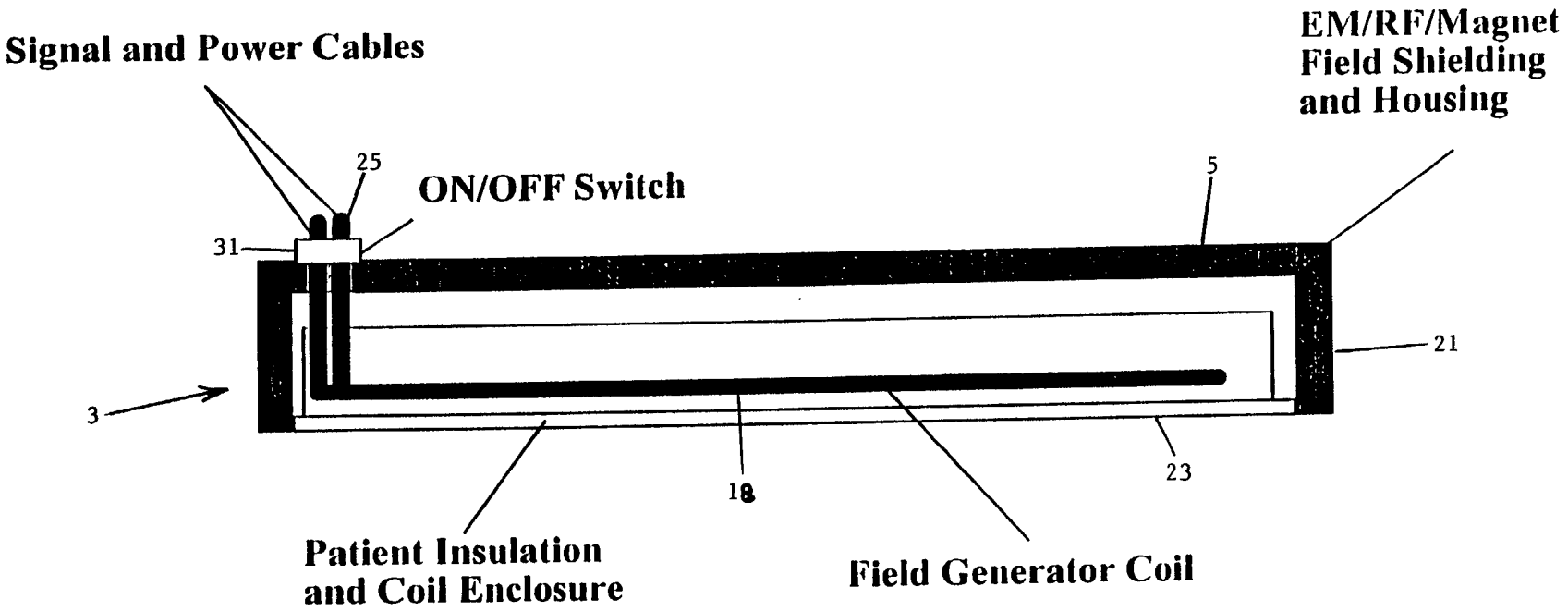


FIG. 12

Remote Controlled Current-Voltage Unit Cell

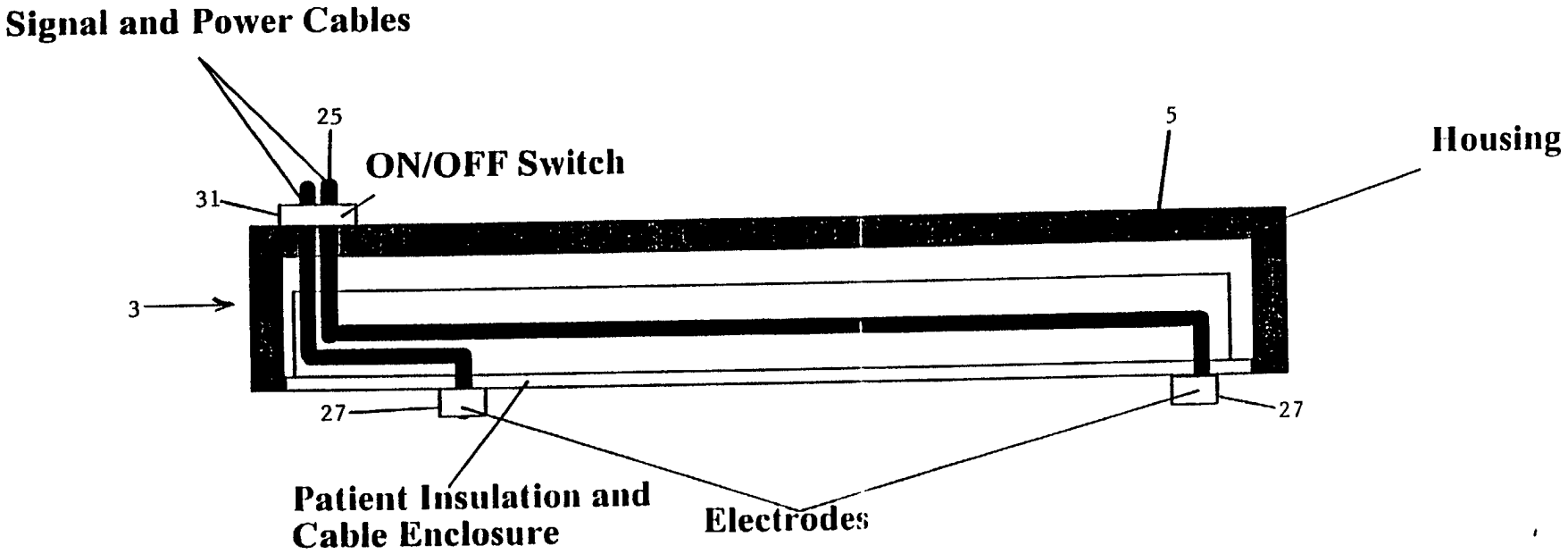


FIG. 13

Remote Controlled/Self Contained Flexible/Cylindrically Shaped Multiple Unit Cell for Bone Regrowth and Other Applications Having Any Type Activated Region Having Multiple Field/Current-Voltage Control Sensors

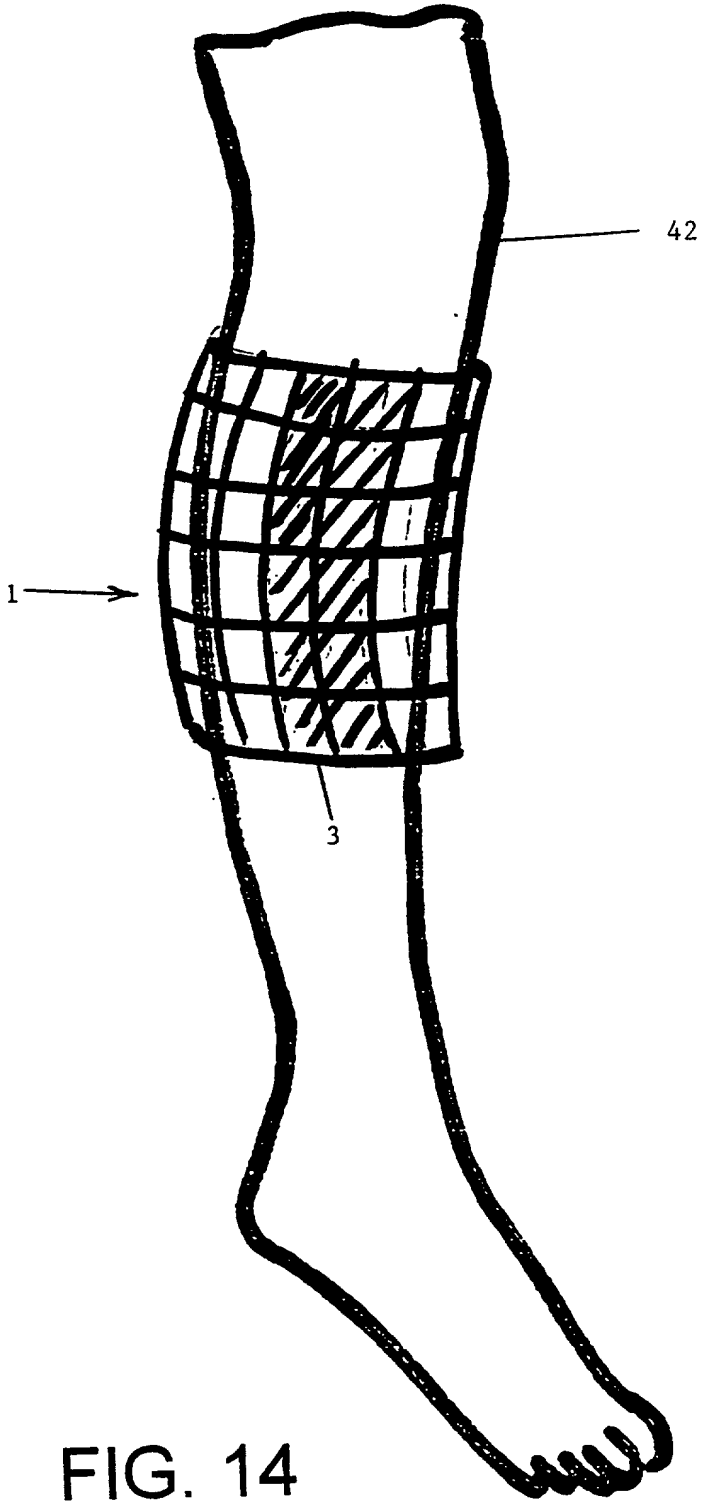


FIG. 14

Remote Controlled / Self Contained Flexible/Cylindrically Shaped Unit Cell for Bone regrowth and Other Applications

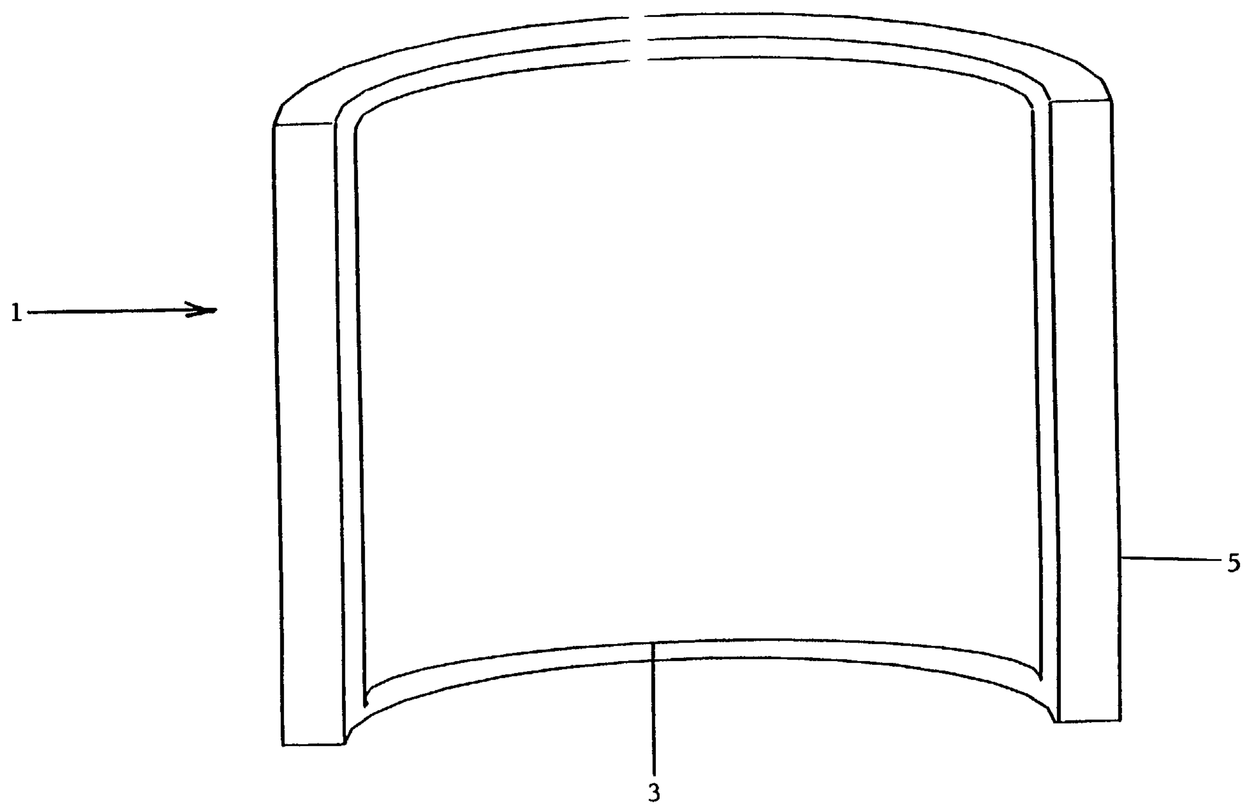
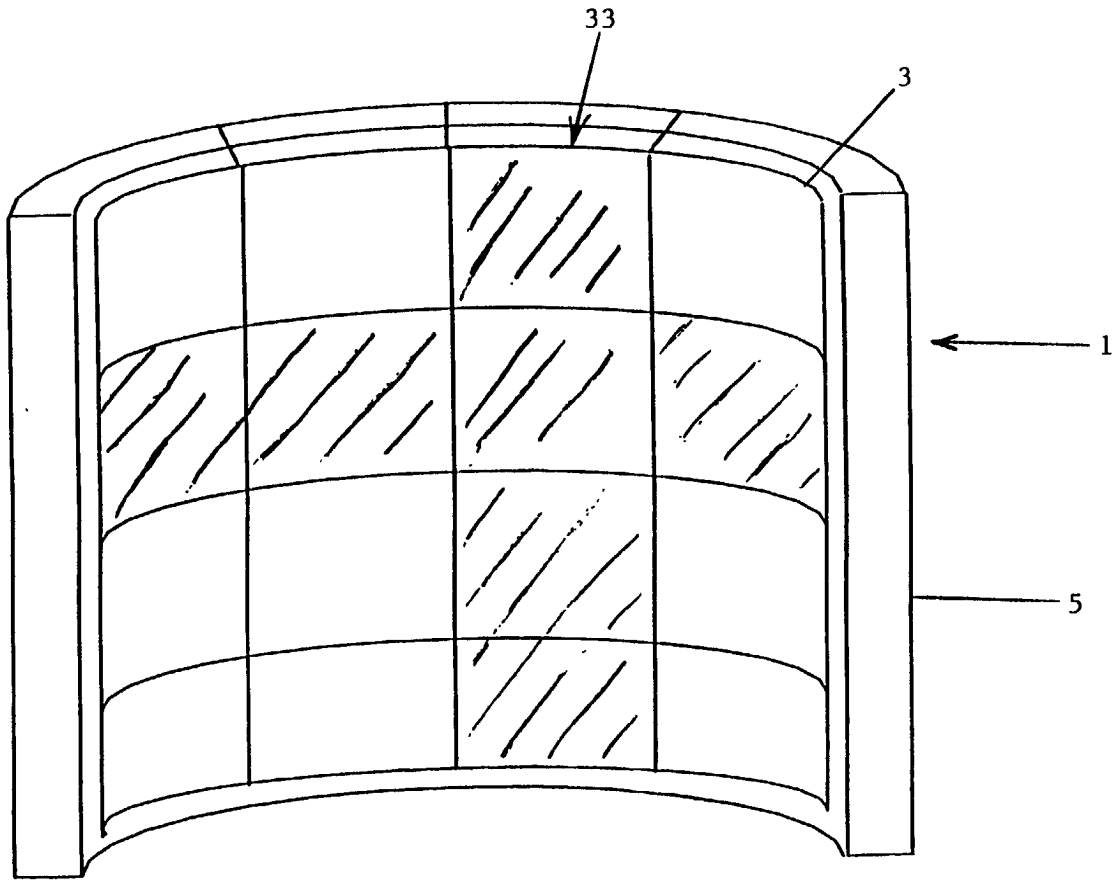


FIG. 15

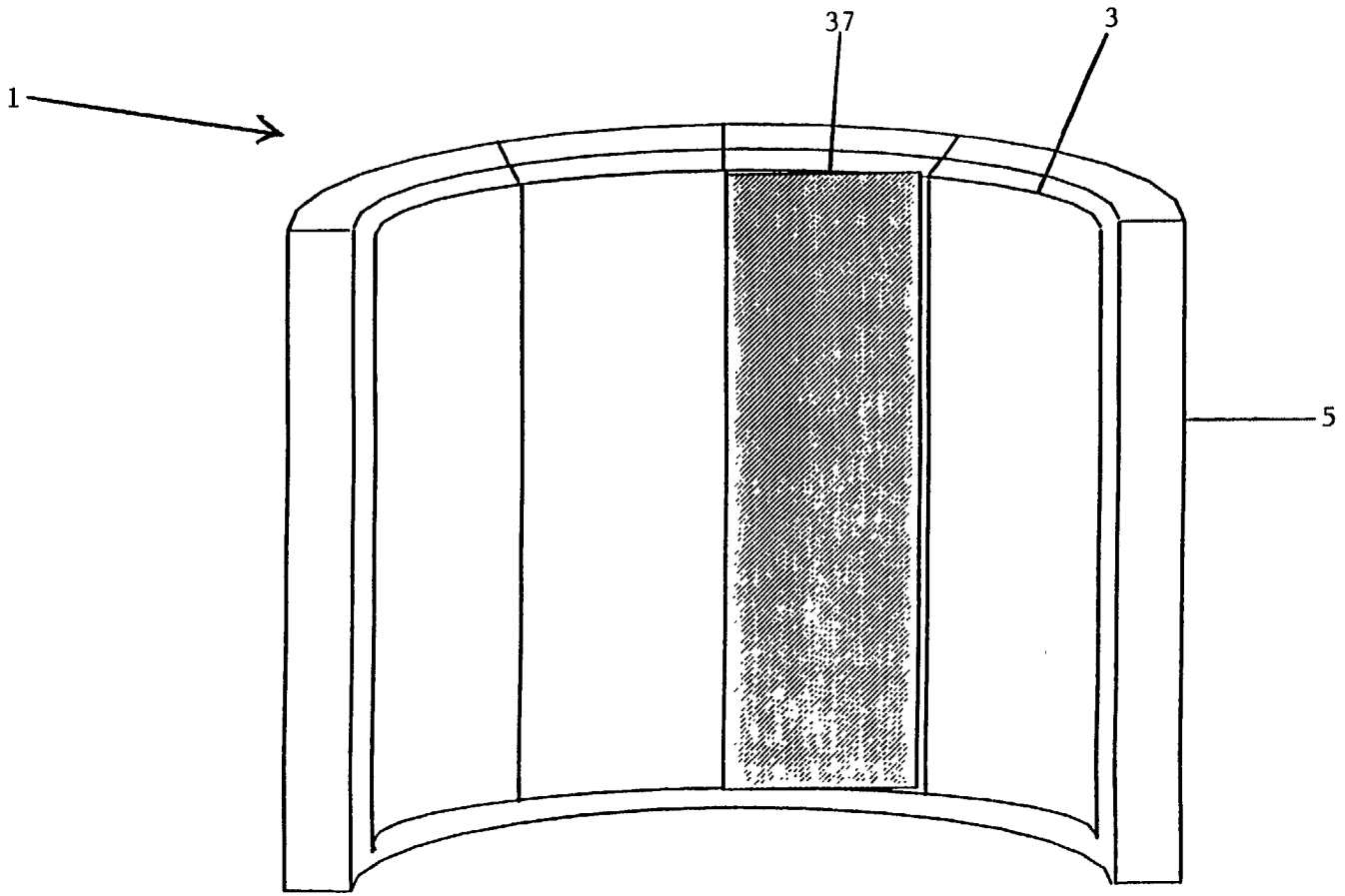
Remote Controlled/Self Contained Flexible/Cylindrically Shaped Multiple Unit Cell for Bone Regrowth and Other Applications Having Cross Type Activated Region

FIG. 16



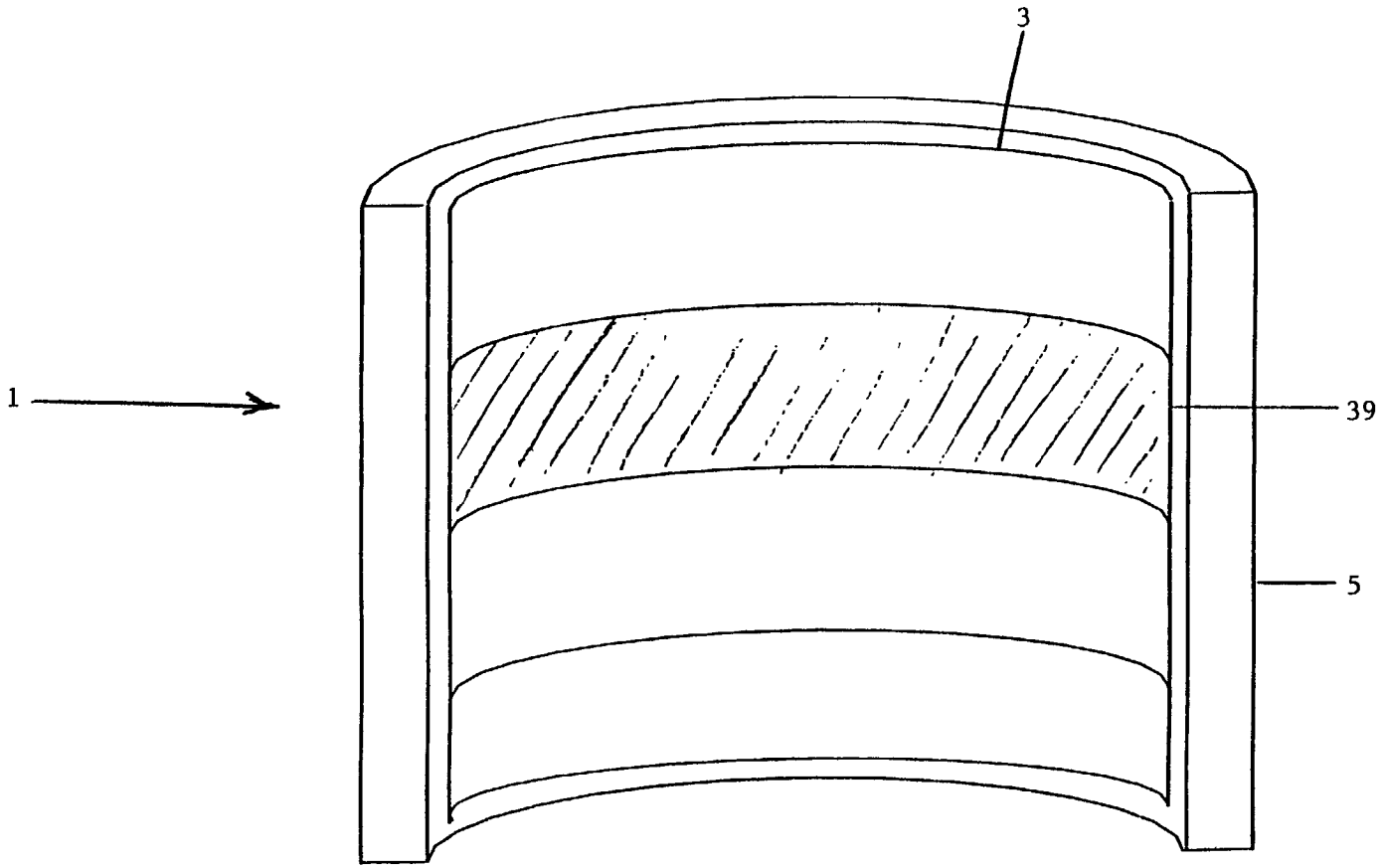
Remote Controlled/Self Contained Flexible/Cylindrically Shaped Multiple Unit Cell for Bone Regrowth and Other Applications Having Elongated Type Active Region

FIG. 17



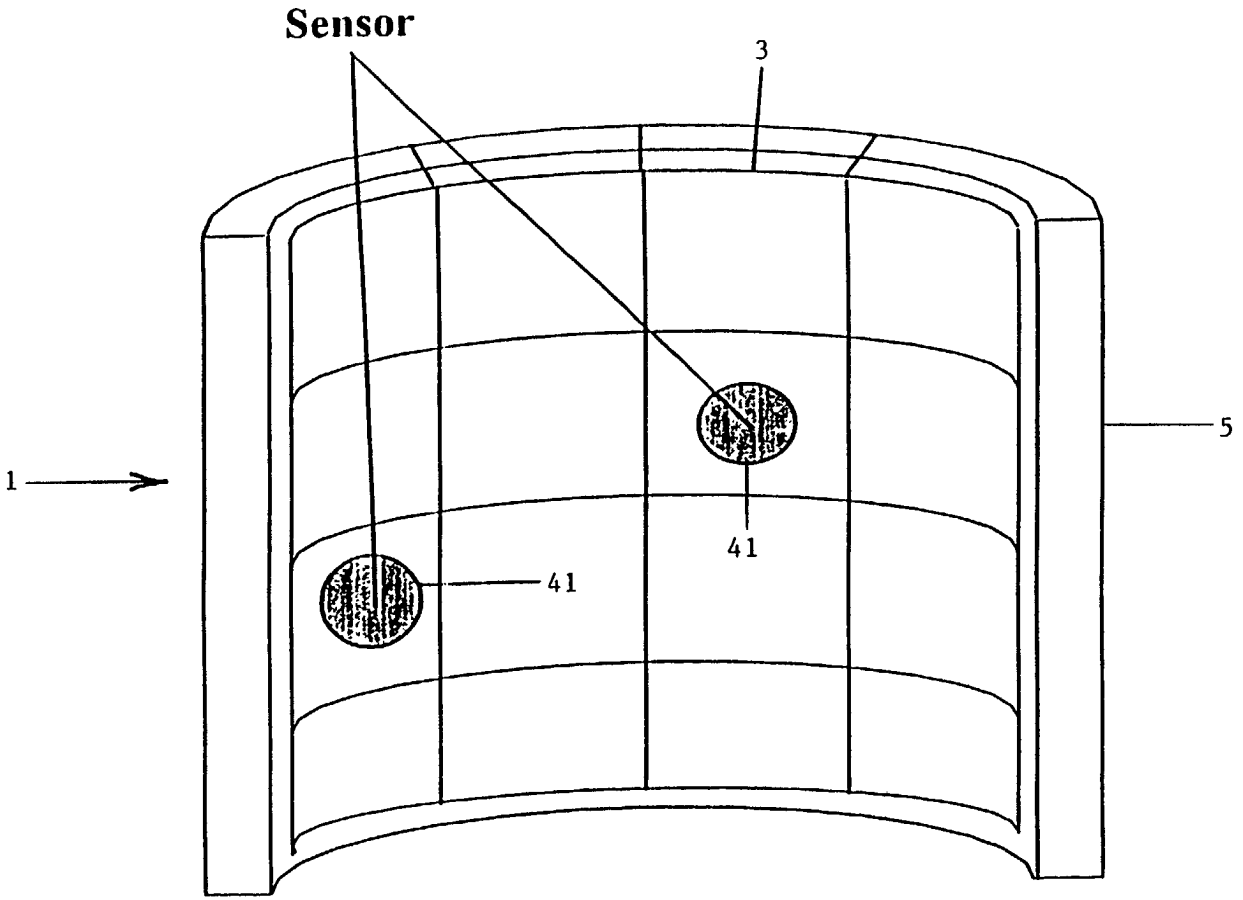
Remote Controlled/Self Contained Flexible/Cylindrically Shaped Multiple Unit Cell for Bone Regrowth and Other Applications Having Radial/Helical Type Active Region

FIG. 18



Remote Controlled/Self Contained Flexible/Cylindrically Shaped Multiple Unit Cell for Bone Regrowth and Other Applications Having Any Type Activated Region Having Multiple Field/Current-Voltage Control Sensors

FIG. 19



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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

[X] Declaration Submitted with Initial Filing OR [ ] Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number	PHOENIX
First Named Inventor	PANDELISEV
COMPLETE IF KNOWN	
Application Number	/
Filing Date	June 5, 2000
Group Art Unit	
Examiner Name	

As a below named inventor, I hereby declare that:

My residence, post office address, and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Multiple Selectable Field/Current-Voltage Pads Having Individually Powered and Controlled Cells

(Title of the Invention)

the specification of which

[X] is attached hereto

OR

[ ] was filed on (MM/DD/YYYY) [ ] as United States Application Number or PCT International Application Number [ ] and was amended on (MM/DD/YYYY) [ ] (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or 365(b) of any foreign application(s) for patent or inventor's certificate, or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or of any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	NO
			[ ]	[ ]	[ ]
			[ ]	[ ]	[ ]
			[ ]	[ ]	[ ]
			[ ]	[ ]	[ ]

[ ] Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

I hereby claim the benefit under 35 U.S.C. 119(e) of any United States provisional application(s) listed below.

Application Number(s)	Filing Date (MM/DD/YYYY)	
60/138,300	06/09/1999	[ ] Additional provisional application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

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DECLARATION — Utility or Design Patent Application

I hereby claim the benefit under 35 U.S.C. 120 of any United States application(s), or 365(c) of any PCT international application designating the United States of America, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

U.S. Parent Application or PCT Parent Number	Parent Filing Date (MM/DD/YYYY)	Parent Patent Number *(If applicable)*

☐ Additional U.S. or PCT international application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto.

As a named inventor, I hereby appoint the following registered practitioner(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith: ☐ Customer Number [ ] → *Place Customer Number Bar Code Label here*

OR

☐ Registered practitioner(s) name/registration number listed below

Name	Registration Number	Name	Registration Number
James C. Wray	22,693		
Meera P. Narasimhan	40,252		
Marcus R. Mickney	44,941		

☐ Additional registered practitioner(s) named on supplemental Registered Practitioner Information sheet PTO/SB/02C attached hereto.

Direct all correspondence to: ☐ Customer Number or Bar Code Label [ ] *OR* ☒ Correspondence address below

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Country	US	Telephone	(703) 442-4800	Fax	(703) 448-7397

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Name of Sole or First Inventor: ☐ A petition has been filed for this unsigned inventor

Given Name (first and middle [if any])	Family Name or Surname
Kiril A.	Pandelisev

Inventor's Signature	✓ K A Pandelisev					Date	6/2/00
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Post Office Address							
City	Mesa	State	AZ	ZIP	85205	Country	US

☐ Additional inventors are being named on the ___ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto